

CLAIMS

1. A method for manufacturing an aqueous bitumen-aggregate mix by mixing an oil-in-water bitumen emulsion containing an emulsifier, a mineral aggregate, additional water and a de-emulsifier at a temperature from 0 to 40°C, characterized in that the bitumen emulsion has a pH-value between 1-5 and that the emulsifier contains a salt between a polyvalent phosphoric acid and a diamine of the formula



where one or two of the groups R_1 , R_2 , R_4 and R_5 designate a hydrocarbon group of 6-22, preferably 8-20 carbon atoms, and the remaining R_1 , R_2 , R_4 and R_5 groups are an alkyl group with 1-4 carbon atoms, and/or a group $-(A)_sH$, where A is an alkyleneoxy group with 2-3 carbon atoms, and s is a number from 1-4, R_3 is an alkylene group with 2-4 carbon atoms and n is a number from 0-2; and that the de-emulsifier contains a hydraulic cement.

2. A method according to claim 1, characterized in that the diamine of formula I contains at least one methyl group and at least one group of the formula $(A)_sH$, where A is ethyleneoxy and s is 1.

3. A method according to claim 2, characterized in that the ratio of the average number of methyl groups to the average number of ethyleneoxy groups in the diamines of formula I is from 1:6 to 3:1.

4. A method according to claim 1, characterized in that the diamine of formula I contains a compound, where the remaining groups are all methyl, or a compound, where the remaining groups are all groups of the formula $(A)_sH$, where A and s

have the meaning mentioned above, or a mixture of these compounds.

5 5. A method according to claim 4, **characterized in that** the diamine of formula I contains a mixture of the two types of compounds in a weight ratio from 1:10 to 10:1.

6. A method according to any one of the claims 1-5, **characterized in that** the weight ratio between the diamine salt of the emulsifier and the cement is from 0.15-1.5.

10 7. A method according to any one of claims 1-6, **characterized in that** the phosphoric acid is orthophosphoric acid.

8. A method according to any one of claims 1-7, **characterized in that** the hydraulic cement is a Portland cement.

15 9. A method according to any one of claims 1-7, **characterized in that** the bitumen has an acid content between 0.05 and 1 mg KOH/g of the bitumen.

10. An aqueous bitumen-aggregate mix, **characterized in that** it contains

20 100 parts by weight of an aggregate,
6-20 parts by weight of bitumen,
0.1-3 parts by weight of the salt defined in any one of claims 1-7, and
0.1-2 parts by weight of hydraulic cement.

25 11. A diamine salt, **characterized in that** it is the salt defined in any one of claims 1-7.

12. An acidic oil-in-water bitumen emulsion, **characterized in that** it has a pH-value between 1 and 5 and contains 0.4-20% by weight of the salt defined in any one of claims 1-7.

30 13. Use of the salt defined in any one of claims 1-7 as an oil-in-water emulsifier for bitumen.